DOCUMENT RESUME

ED 097 262 SO 007 827

AUTHOR Bangdiwala, Ishver S.
TITLE The Effect of Socio-Economic Levels on Selected Educational Factors in Puerto Rico.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE Jun 74
GRANT OEG-2-2-2B017
NOTE 87p.

EDRS PRICE MF-$0.75 HC-$4.20 PLUS POSTAGE
DESCRIPTORS *Academic Achievement; *College Admission; Comparative Analysis; Comparative Education; Correlation; *Dropouts; International Education; National Surveys; School Surveys; *Socioeconomic Influences
IDENTIFIERS *Puerto Rico

ABSTRACT

This project investigates changes in the socioeconomic level (SEL) of the families of Puerto Rican school children in the last 10 years. The effects of these changes on selected educational variables--reading comprehension, school dropouts, and admission to institutions of higher education--are studied. A comparison is made between data collected in 1966 and that collected in 1973 for the present study of a probability sample of 884 students from intermediate and high schools both public and private, urban and rural. The results of the comparative analysis indicate that the SEL for school children is increasing, that there is a high correlation between SEL and reading comprehension scores, that dropouts have continued to be very low in comparison with public schools, and that the existing relationship between SEL and academic achievement creates discrimination toward the "poor" in university admission policy. The study confirms that which was expected; however, continuing study of socioeconomic and educational levels, particularly in the developing countries, is necessary if planning and resource allocations are to be effective. (JH)

University of Puerto Rico
Río Piedras Campus
College of Education
Department of Graduate Studies

THE EFFECT OF SOCIO-ECONOMIC LEVELS

ON

SELECTED EDUCATIONAL FACTORS IN PUERTO RICO

BY

ISHVER S. BANGDIWALA, Ph. D.
Professor

June, 1974

(This investigation was supported by the U.S. National Institute of Education research grant number OEG-2-2-2B017)

The Effect of Socio-Economic Levels

On

Selected Educational Factors in Puerto Rico

By

Ishver S. Bangdiwala

Preface

The study was initiated with great interest and enthusiasm and inspite of a number unexpected circumstances, which created many obstacles, the final report could be prepared in time.

The success of this study has been due to the help, in one way or the other, from many individuals (colleagues, friends and family) to whom I am highly obliged. Dr. José A. Cáceres, the Dean of the College of Education and Drs. Oscar Loubriel and Ada Elsa Izcoa, the former chairpersons of the Department of Graduate Studies had constantly encouraged me to carry out the research and had always tried their best to give me time and facilities required for it. The present Department Chairman, Dr. Ramón Claudio has continued the same attitude towards me.

Mr. Alex Gimmon, a former colleague in the Department gave me his cooperation in preparing the proposal of the study and professor José Ruiz Vega, former assistant to the chairman Dr. Izcoa, also had been helpful in getting the project started. Professor Juana A. Méndez, former Director of Educational Research Center of the College, was very helpful in advising me on a number aspects related to the study, particularly, the Reading Test. Mr. José Lugo Arroyo, Director of the Statistics Division of the University's Central Administration Office, besides supplying me all the necessary data on the University and the schools, also contributed with useful ideas.

Probably the hardest work put in the project was carried out by two persons: Mr. Tomás Reyes Rivera, the Research Assistant and Mrs. Judith A. Aponte de Reyes, the Secretary. Without knowing what word "comfort" is, these two persons have contributed their best efforts to the work of the study. Mr. Reyes had the charge of all the field work besides the office duties of the project. Later he had to do the coding and scoring of the questionnaire and the tests. He was partly helped by Mrs. Manuelita Gorbea of the Educational Research Center in administering the questionnaires and the Reading Tests, and by M/S. Ramiro Bonilla, and Henry Mc Cartney, part time research assistants, in coding and tabulating.

Mrs. Judith Aponte de Reyes had done all the office secretarial work for the project. Mrs. Isabel Llompart came in to help Mrs. Reyes on few ocassions, too.

When the project work had to be reassembled after the student's strike on the Campus in Fall, 1973, Miss Felícita Escanella, a professional colleague, was the one who reorganized the work, checked all the data, and completed and verified the coding with the help of my wife Pushpa.

The computational help was expected to be available from the Data Processing Center of the Campus but because of their very tight schedule, the resort was taken of the project director's personal electronic desk computer DIEHL Sigmatronic. My two sons, Dweepkumar I. and

Shrikant I. gave me a hand in completing the computations.

All these persons did their best so that the study could be carried out as as it should. As the project was under the grant which was very limited in its amount, all those who helped complete the project did do willingly only on voluntary basis, except for due payments made to the research assistants and the secretary for part of the time. The amount of money granted was barely enough for the two research assistants (even though part time only), and the secretary, They, too, had to put in a great amount of extra hours of work for the completion of the study.

It is hoped that the result of this study serves as an useful guide to the educators and officials of the system to understand the problem and to the research scientists as a step for further investigation in this area.

I.S.B.

June, 1974

Index

Page

I. Introduction

There are a number of indicators being used these days measured progress of a county. Some of these indicators are: Gross National Product, personal income, population growth rate, education and literacy level and such others. Social and political scientists use this information to try to determine a county's ranking or status withing a group of nations of the world. According to this ranking in terms of such indicators mostly bases on socio-economic factors, the international agencies determine the necessary aid (monetary or otherwise) for the development of each country or nation.

Within a local political unit, such as a nation or a state of a nation, several occasions arise when specific programs are needed to be implemented or improved. For this purpose, a priority needs to be determined. Particularly some kind of classification based on socio-economic level of the regions or groups within the nation is necessary in order to utilize the available resources adequately. Example of such programs in a nation or a county, developing or developed, are plenty. The field of education, health, welfare, housing, agriculture are some of the most important ones where the decisions are to be arrived at after taking into consideration the individual need in relation to the development of the entire nation. Education in particular, is the field where almost all the countries have been placing emphasis in order to achieve the desired progress in the modern world

as it is the education of an individual which is the most significant single factor that determines one's future career. Collectively, therefore, the nation's development depends mostly on the educational level of its populace.

In order to improve the educational level of the nation, various measures are taken, such as improvement in teacher's preparation, suplying adequate facilities, implementation of better methods of teaching and probably the most important of all, encouraging people to be educated, making them conscious of the need and importance of education in one's own life and at the same time making them aware of their contribution and part to be played towards the future development of the country. For this purpose, it is important for educational programs to bring forth and study all factors which might influence a child's education. These factors are many. Some of them are motivational, otners are social, economic and those related to personality. Of all the factors affecting a child's education, it has been believed that the enviornmental surrounding of the child has considerable influence on his educational endeavors. Such environment, besides other factors, is believed to be associated with socio-economic factors such as family income, parent's occupation and education, physical and material possessions and other facilities and comfort provided by the family that could help the child in his school work and other related activities for his individual development.

BEST COPY AVAILABLE

Several studies have been made in many countries, including the United States and Puerto Rico, about the relationship between academic achievement and various socio-economic variables. In most of the cases this relationship is studied with individual socio-economic factors. In only a few studies, the relationship is established with composite index of such factors. Most of the studies show positive correlation between academic and the socio-economic variables. Some correlations have been very high, while others are quite weak. There is still a tendency among educational researchers to continue studying this relationship, because in a dynamic society, the socio-economic factors keep on changing their scale almost constantly and hence are likely to affect the educational variables in a manner quite different from the one previously established.

The situation in Puerto Rico, in particular, is very distinct. Being a Commonwealth of the U.S.A. but having a different cultural background, it has, different world meanings. The variables measuring social and economic levels in Puerto Rico have been changing their influence continuously because of the constant upward trend in economic and social progress. Therefore, it is necessary not only to measure the socio-economic level of the Puerto Rican community from time to time but also to carry out continuous research specific to its relationship to the educational level.

II. Purpose of the Study

In 1952 the Department of Education of Puerto Rico adapted a Spanish version of Sims Questionnaire (Departamento de Instrucción Pública, 1952) in order to measure and prepare norms of socio-economic levels of the students in the public schools. As an initial effort, the study was successful. However, that scale has proved itself inappropriate for application since several years. The Superior Educational Council (Consejo Superior de Enseñanza, the present Council on Higher Education) of the University of Puerto Rico in its study of the Puerto Rican School System (1962) and its project of developing a Puerto Rican Scale to measure Socio-economic levels (1966a, b) indicated that the use of the adapted Sims Questionnaire is limited for two main reasons:

(1) The Scale was adapted in 1952 and for this reason do not include items apropriate to measure socio-economic level today (1962). Since then much progress has been made in Puerto Rico which is not reflected in the 1952 adaption of the Sims Scale.

(2) The sample used in 1952 to prepare norms of socio-economic levels was limited in size and did not represent all types of schools of the Island.

Since the initial attempt to have a socio-economic scale for Puerto Rico two major studies have been undertaken in the Island. The first study was

carried out by the Superior Educational Council's Division of Educational Research. The results of this study, published in 1966, in two volumes, Estudio Socio-económico I, II (1966a, 1966b) consisted of two sets of scales developed by the author of the present study. One was a set of scales for the families of university freshmen (public and private), in Puerto Rico (1966a) and the other was a set of scales for the school children both from public and private schools of Puerto Rico (1966 b). These scales were based on data collected during the years 1961 and 1962, respectively, from representative stratified random samples of the two types of student's populations.

The second study was the one made by the Puerto Rico Department of Education in 1969. It was an adaption of the Hollingshead "Two Factor Index of Social Position" with an elaboration of it for the public school children of Puerto Rico.

The difference between the scales for school children prepared by the Council and that of the Department is that the Council's Scales are based on a representative sample of all school types of Puerto Rico, including the private schools. Again, the scales are prepared with more detailed and precise factor loadings and have several alternatives, such as long, medium and short scales depending upon the number of variables involved in each. In addition, each of the variables has varying number of categories in

the scales. On the other hand, the Department's scale is based on only two factor categories and is based on a sample representative of 21 public schools districts under Title I proyect. Both the scales are being used in defining socio-economic index in Puerto Rico, although no study has been made to compare their uses and efficiencies.

The two studies, although having slightly different objectives, did produce similar and supporting results. Both studies found that 75 percent of the Puerto Rican school population is classified as middle class and lower. The 1966 Council's scale provides greater differentiation, 7 groupings, that the Hollingshead adaptation, 4 groupings; but both show a large cluster of individuals in lower and middle-low classes.

It is believed that in the schools of Puerto Rico a self-selected segregation or homegeneous grouping on the basis of socio-economic level exists. In the Council's (1966 b) study it was found that the public schools, both rural and urban, are composed of predominantly middle-low and lower class students; for example, urban has 79.4 percent and rural 98.9 percent of these classes, whereas the private schools are predominantly upper-middle and upper class, about 95 percent. Thus, great differences exist between the student bodies of the private and public schools. This situation in schools, in turn, seems to influence the socio-economic level of the students enrolled at the institutions of the higher education in Puerto Rico.

Using the adaptation of the Hollingshead scale and comparing socio-economic level (SEL) with academic achievement, it was found in the

Department's study (1969) that the socio-economic status greatly affects achievement. In the mean raw score in reading test given to grade I pupils, the academic difference of 19.16 points was found between the highest and lowest socio-economic levels. In grade 2 the difference was 17.92, and in grade 3 the difference was 16.66. As indicated by this study the difference between mean scores between SEL levels is decreasing, but it is not known if this decrease is continuous with years of schooling. The Council's study indicates that this decrease in differences between the highest and lowest SEL groups is somewhat continuous but small in magnitude. According to their 1966 study, 78 percent of the freshman class in the universities of Puerto Rico that years were classified as middle to upper class. Thus, it is said that the educational and professional opportunities are "limited" to those who are "better of". In this manner, the self-selection process in education aids in perpetuating stability in socio-economic levels.

Of course the picture is not so grim that changes are impossible in Puerto Rico. Since it is a developing country offering upward mobility through industrial growth and individual initiative, the SEL distribution cannot remain stable. It is, therefore, one of the purposes of the study, to determine if the SEL distribution has changes in recent years.

It is also important to measure the changes, if any, in socio-economic levels in the public and private schools of Puerto Rico to see if the gap between the two has widened or diminished. Hence the present study has

been planned specifically:

(1) To study the change in socio-economic level in Puerto Rico during the recent years.

(2) To identify the population distribution in the public and private schools according to the socio-economic levels, and

(3) To identify educational differences and similarities on the basis of the socio-economic level.

The last purpose also inculdes plan to study if school drop-out is related, in some way, to SEL and to illustrate the problem faced by the higher education institution with respect to admission of first year students.

III. Methodology

The present study consists of 5 main parts, namely

(1) Selection of the scale for measuring socio-economic level (SEL)

(2) Comparison of changes in socio-economic levels by school type (public urban, public rural and private)

(3) Relationship between SEL score and the Reading Comprehension Test (RC) Score.

(4) Relationship of SEL and school drop-out

(5) Problem of admission to university freshmen class

Selection of Socio-economic Level (SEL) Scale:

Section IV of the study deals with the first part, namely, the selection of the SEL Scale to be used in this study. For this purpose three scales are compared: the Hollingshead Two-Factor Index and the two Superior Educational Council (1966a Scales, one with 2 variables and the other with 32 variables . The data used are the socio-economic data of school children collected for a 1966 project of the Council which the author of this reported directed. Pearson's Correlation Coefficient is used to establish relationship among the scores obtained by the three scales for 36 different groups of students included in the sample. It is shown that the Council's Scale CSE-SEE--II using 32 variable is better than the other two for the purpose of measuring SEL.

The Universe and the sample:

For the second part of this study, described in Section V, the selected SEL Scale is used to compare the changes in the SEL by the three different school types, namely, public urban, public rural and private. For this purpose, the data are based on information collected from a sample of 884 pupils of the public and private schools of Puerto Rico, through the Council's Socio-Economic Questionnaire (with some items added) and scored according to the scale CSE-SEE-II. The study design was based on a stratified-cluster probability (random) sample from the three universes: students from the public-urban, the public-rural and the private schools. Within the two universes of the public school, the strata consisted of the school regions as defined by the Department of Education. From each regional stratum, the sample of groups was selected from the Intermediate (Junior high school- 7,8,9) and the (senior) High School (19,11,12) grades. Elementary grade students were not included in this study due to their young age. The private school sample was drawn at random from the Intermediate and High School grades.

The analysis of each of the three universes is made independently, with estimates for the total Island arrived at after applying appropriate weights due to disproportionate representation in the sample by school type. The sample of private school is proportionately higher compared with that of

the public (urban and rural) schools, because of a larger variance in the former. The sample distribution is given in Appendix A, along with the weights applied for obtaining the estimates for the Island.

The sample sizes for the study were 502, 177 and 205 for the public-urban, the public rural and the private school respectively. The corresponding fluctuations in the estimates expected with these sample sizes would not exceed 4.5, 7.5 and 7.0 percent for the respective stratum at 95 percent probability level of confidence, assuming that the variance is maximum. Furthermore, the stratification by regions and school levels tends to reduce the standard error and hence the fluctuation.

Correlation of SEL and RC Scores

The third part dealing with the effect of the SEL on the academic achievement index is dealt with in Section VI. For the purpose of studying this relationship, it was first proposed to estimate the correlation with different types of academic achievement, such as, class average (grade point average, GPA), grades obtained in specific subject courses, general ability measure and such others. However, when the teachers of the classrooms in the selected sample schools were visited, it was realized that the grading system from school to school and from teacher to teacher differed to a great extent. In many cases grade point average was not available and, if available, all the groups were not evaluated on the same criteria nor similar subjects. It

was thus impossible to calculate equivalent scores. Not all of the students had the general or other specific ability scores or other tests scores which could be made available for comparative purpose. This situation made it necessary to administer a common test to all the students so that the results could be comparable due to uniformity of the measuring instrument and scoring method. The test selected was the spanish Reading Comprehension Test (Prueba de Comprensión de Lectura, Nivel Intermedio y Superior, Forma A, 1965) prepared by Professor Juana A. Méndez of the Division of Educational Research of the Superior Educational Council and normalized for the schools of Puerto Rico in 1965. Different tests are prepared for different school levels. The Level 3 of the Test is for grades 7, 8 and 9 (the intermedial level) and Level 4 is for grades 10, 11 and 12 (the High School level). The level 3 test has 45 items with one point scored for each correct answer and the Level 4 has 58 items, also with one point for each correctly answered item.[1/]

The sample for administering the test was the same as the one described above for collecting SEL data. In total, there were 31 groups of students in the sample representing Intermediate and High Schools grades in public (urban, rural) and private schools. The total number of students amounted to 884. The same students in the sample had to be used to administer the Council's Questionnaire and the Reading Test, because the purpose was to

---

1/ The tests, being of confidential character, are not included in this report.

correlate the SEL with the RC Scores of the students.

The sample size for Intermediate grades was 514 in total and 216, 165 and 133 for the public urban, public rural and the private schools respectively. The sample size for the High School grades was 370 students composed of 286 from the public urban, 12 from public rural and 72 from the private schools.

Pearson's Correlation Coefficient is used to study the relationship between the SEL Index and the Reading Comprehension raw score. The prediction equations are also worked out to estimate scores based on known SEL Index.

Necessary permission was taken from the Secretary of Education and from the principals for the schools to administer the tests. The groups to be visited were selected ar random according to the sample design. At no time, the group was left to be selected by the school authorities nor by the interviewer. Two experienced interviewers trained by the Project Director, were used for the study. On a number of visits, the Project Director accompanied the interviewers.

The Questionnaires were scored by two research assistants and coded and tabulated by them. The tests were also scored by them according to the instructions given by the official of the Council in charge of the tests.

The numerical analysis was made by the Project Director and partly by a research assistant using a desk electronic computer DIEHL Sigmatronic

Model, with built-in correlation and regression programs.

School Drop-out

In Section VII, the drop-out rates of the public and private schools are studied and their relationship with SEL is demonstrated. The data on the drop-outs were obtained from the Department of Education through the Statistics Division of the University Central Administration.

SEL and Higher Education

The problem faced by the institutions of higher education, particularly by the University of Puerto Rico, a state university as to the admission criteria for entrance to the first year study is discussed and focussed from the view point of the socio-economic level of the students. An illustration, using 1972-73 data of the Río Piedras Campus, is given for understanding the problem. The University data were supplied by Mr. José Lugo Arroyo Director of the Statistics Division of the Central Administration of the University of Puerto Rico, who also helped in the analysis and interpreration of the data.

IV. Selection of SEL Scale

Characteristic to measure

When we think of measurement, the first thing that comes to the mind is an instrument with which to measure the characteristic and the unit in which to express it. In case of measuring the socio-economic level, the characteristic to measure is a "level" which could be defined as the relative position of the individual within a specified system; however when the qualifying adjective "socio-economic" is added to it, the significance of the relative position is looked at from the sociological and economical viewpoints. Thus this characteristic named "socio-economic level" is an attribute which is a kind of a compound measurement and can not be measured directly by one single item. It is an abstract attribute and can only be measured indirectly in terms of measurements of several variables (say, $x_1, x_2, \ldots x_p$), each one reflecting in some way the social and economic aspects of the level. These measurements of different variables may form one single composite index (say, L) of the level. L then is a function of the x-variables: $L = f(x)$.

The variables

The problem, then, arises as to

(1) how many variables would be needed to measure the level,

(2) how to select the variables that would measure effectively the "level" and,

(3) the criteria with which to select the function of the measurements of different variables to arrive at one single index.

(1) Number of variables

Only one variable, when used to measure the socio-economic level, can differentiate the extreme positions of the level on the scale but cannot precisely distinguish levels at the intermediate positions. A couple of more variables may be better indicators than one but the difficulty would still be in reliability of the composite index, for a change in one of them may substantially change the position of the index on the scale. Too many variables may complicate the measurement and may not significantly increase the efficiency of the index of level as a whole. Thus, the number of variables for a scale should be a balance between the easiness and stability of the x-variables and an acceptable efficiency of the Index L.

(2) Selection of variables

The x-variables which should measure the socio-economic level L should, of course, reflect the social and economic characteristics of the situation being measured. In a society there does, usually, prevail a status structure at a certain time or during a certain period of time, and eventhough there exist certain well-established items or characteristics of the level the importance of these items is subject to change from time to time due to the ineffectiveness of the item to differentiate one level from the other at different

positions on the scale. Some items remain steady over a long period of time while other may change quickly.

For example, Chapin (1935) used the living room furniture as the only variable to measure the socio-economic level, assuming that the people judge the social position of a family from the way the living room is furnished. Later, Guttman (1942) revised Chapin's Scale. Warner (1949) found that the capacity for predicting socio-economic status was in the variables of occupation, income, sources of income, type of households, residential area and education. Kahl and Davis (1957) found the same variables most important but slightly in different order. However, the latter were able to isolate two groups of variables. One group consisted of individual characteristics, such as occupation education, class consciousness, income and others and the other group was made up of the ecological variables, such as residential area and the type of household.

Hollingshead in his study with Redlich (1953) on relationship of mental illness and the social stratification, used a socio-economic index based on occupation, education and residential area. giving the heaviest weight to occupation and the smallest to the residential area. Later, Hollingshead (1965) developed a simple index using only two variables, namely, occupation and education.

In a study carried out under the direction of the present author for the Superior Educational Council (1966a) of the University of Puerto Rico dealing with measuring of socio-economic level of the families of university freshmen, there were 118 variables tried out to start with to arrive at an index. After proper analysis the variables were screened out based on their correlation with the level. The study recommended to use an Index based on 24 variables which had the highest correlation with the Level L. The reason was that Puerto Rico being a "developing" country, the social and economic mobility of the individuals was significantly great at the time. In addition, the efficiency of the scale did not increase substantially by further reduction of variables. The mobility factor is very important in this kind of measurement. Because of slight change in a few factors, the class level may change its position substantially. The first 10 of these 24 variables in the Council's study were, in order of importance: family income, mother's education, father's education, property value, monthly rental or installment, father's occupation, number of trips out of Puerto Rico, associations membership of father, number of magazines subscribed and possession of family car. In a similar study for Superior Educational Council (1966b) the present author, after starting with 99 variables prepared and recom-

mended a 32 - variable scale for measuring socio-economic level of families of school children. Some of them were different variables and others had different weights from the ones in the freshmen scale. As can be realized a variable which may be found very important in one social set-up could have no discriminating power in another situation. The variables of these two scales are listed in Tables 1 and 2, with their relative weights, the number of categories and their values on the scale.

Also it could be very well understood that "income" is a variable which seems to be a necessary but not a sufficient measurement for the index of the level. The status of level is determined, not only by the amount of money earned but also by the way the money is spent. For example, a laborer and a teacher may earn the same amount of money but each would have a different way of spending it. Each may have different types of associations, activities, hobbies, and saving habits. Income, again, has not in all cases shown that it alone is a reliable measurement but on it depende other characteristics of the individual. Hence the advantage of a composite index,

Table 1

Superior Educational Council Socio-Economic Scale for University Freshmen (CSE-SEE-B)

Rank	Variable	Relative weight	Number of categories in the variable	Values of lowest to highest category
(1)	Family Income	.858	6	1,2,4,5,6,7
(2)	Mother's Education	.822	6	2,3,4,4,5,7
(3)	Father's Education	.815	6	2,3,4,5,6,7
(4)	Property Value	.812	5	2,3,4,7,8
(5)	Monthly Rent	.770	5	0,2,4,6,7
(6)	Father's Occupation	.744	8	1,1,1,2,3,3,4,6
(7)	Number of Trips	.737	3	3,5,7
(8)	Father's Membership	.727	4	5,7,7,8
(9)	Magazines Subscription	.684	3	2,4,5
(10)	Number of Cars in Family	.681	4	3,5,6,7
(11)	Kind of Kitchen Stove	.680	3	1,4,5
(12)	Number of Air Conditioners	.677	3	6,9,10
(13)	Monthly Expense Source	.669	8	3,3,4,4,4,5,5,5
(14)	Enrollment Fees Source	.656	9	4,4,5,5,5,5,6,6,6
(15)	Mother's Occupation	.654	8	0,0,0,2,3,4,4,5
(16)	Number of Bathrooms	.635	4	0,4,5,7
(17)	Water Heater	.633	2	3,6
(18)	Mixer (Electric)	.630	2	3,5
(19)	Number of Servants	.624	4	3,5,6,7
(20)	Residence Area	.623	5	4,7,7,7
(21)	Family Saving Account	.614	2	3,5
(22)	Number of Television Sets	.603	3	2,4,8
(23)	Type of Graduating School	.596	2	3,6
(24)	Electric Cake Mix Beater	.591	2	3,5

Table 2

Superior Educational Council Socio-economic Scale for School Children
(CSE- SEE-II)
L_y- Scale

Rank	Variable	Relative weight	Number of categories in the variable	Values of lowest to highest category
(1)	Family Income	.798	5	2,3,4,5,6
(2)	Father's Education	.788	4	1,3,4,5
(3)	Mother's Education	.764	6	2,3,4,4,5,6
(4)	Floor Construction Material	.728	3	2,3,4
(5)	Number of Books in Home Library	.716	4	1,3,4,5
(6)	Mother's Education	.709	8	3,4,4,5,5,6,6,7
(7)	Type of Kitchen Stove	.698	2	2,4
(8)	Type of Windows	.694	3	1,3,5
(9)	Magazine Subscription	.689	3	1,3,4
(10)	Type of Toilet Facility	.687	2	2,4
(11)	Water Heater	.678	2	2,5
(12)	Hand Washing Sink	.674	2	2,4
(13)	Medical Plan	.673	2	3,6
(14)	Number of Bathrooms	.667	4	1,3,5,6
(15)	Clothes Washing Machine	.665	2	3,5
(16)	Electric Cake Mix Beater	.657	2	2,5
(17)	Number of Cars in the Family	.656	3	2,4,6
(18)	Medical Services Used	.655	3	1,3,4
(19)	Roof Construction Material	.653	2	3,5
(20)	Type of School Attending	.650	3	1,1,3
(21)	Outside Wall Construction	.647	2	3,5
(22)	Number of Television Sets	.637	3	1,3,5
(23)	Inside Wall construction	.636	2	3,5
(24)	Parent's Membership	.634	2	2,4
(25)	Type of Associations	.633	2	3,4
(26)	Bath Tub	.631	2	2,4
(27)	Telephone	.629	2	2,5
(28)	Father's Occupation	.624	8	0,0,0,1,2,2,3,3
(29)	Transportation Expense source	.623	3	1,2,3
(30)	Record Player	.605	2	3,5
(31)	Persons per Bedroom	.593	6	1,2,2,3,3,4
(32)	Number of Servants	.558	3	3,6,7

consisting of a sufficiently large number of variables, is that even a reasonably great change in variables, such as income or others does not necessarily affect the total index very much.

3) Function of variables

A number of techniques are available and utilized to arrive at the function of a composite index. In some cases, like the study by Collazo (1958) the item is given values of 1 (one) if the individual possesses it and a 0 (zero) if it is absent. Some studies work out graded values of different positions or alternatives in a certain order. These values may be simple natural numbers such as that used by Hollingshead (1965) or some relative values for each alternative like in Council's studies (1966a,b).

The final index, is in some cases, a simple sum of the individual values or scores, namely,

$$L = x_1 + x_2 + \ldots\ldots + x_p \qquad (1)$$

or a weighted sum of the values, namely,

$$L = a_1 x_1 + a_2 x_2 + \ldots\ldots + a_p x_p \qquad (2)$$

such as in the studies by Hollingshead (1965) and Council (1966 a,b). The simple sum in equation (1) assumes that each variable contributes its value with the same weight as the other. The relative weight a in equation (2) provides appropriate loading to each variable according to its importance in the measuring scale. These weights are

arrived at by different statistical techniques such as multiple regression (Hollingshead 1965 Index) or Factor Analysis Council's 1966 studies using Hotelling's - 1933- method). Table 1, 2 & 3 give the weights and values used in these three studies.

The criteria of the "best"scale is its validity to measure and its reliability, i.e. the reproducibility of the scale measured in form of stability and in turn, by its opposite, the variability.

Scale Selection for the Study

For purpose of selection, three different scales are compared in this section by applying them to a set of data collected in 1966 by the present author. The data refer to a sample of 825 secondary (7 to 12 grades) school children of the public school system of Puerto Rico. The scales applied are:

(a) L_x based on a two variable (occupation and education) index computed by factor analysis with relative weights for each variable and using relatively graded values for the scale as shown in Table 4. The equation is:

$$L_x = a_1 x_1 + a_2 x_2 \quad \text{(3)}$$

(b) L_y, based on the ... variable scale (occupation, parent's education, income and others), by using factor analysis with relative weights

Table 3

Weights used in Hollingshead 2-variable Index
L_z-Scale

Variable	Weight	Number of Categories	Values of lowest to highest category
Occupation	7	7	7,6,5,4,3,2,1
Education	4	7	7,6,5,4,3,2,1

Table 4

Weights Used in The L_X Scale

Variable	Weight	Number of categories	Values of lowest to highest category
Education	.788	4	1,3,4,5
Occupation	.624	8	0.0.0.1,2,2,3,3

for each variables and relatively graded values of alternative like in L_x. This is the scale CSE-SEE-II prepared by the Council (1966b)

$$L_y = b_1 y_1 + b_2 y_2 + \ldots\ldots + b_{32} y_{32} \quad \text{(4)}$$

(c) L_z, based on 2-variable (occupation and education) by using a multiple regression with relative weights for each and ranked value of alternatives in order of natural numbers (Hollingshead, 1965)

$$L_z = c_1 z_1 + c_2 z_2 \quad \text{(5)}$$

From the summary of results given in Table 5, it is noticed that the scale L_y is the most reliable of the three having the smallest variability (coefficient of variation, 16.1% for urban and 14.3% for rural), while L_z has higher variability than L_y. The variability of L_x index is very high, almost not acceptable for practical applications. In general, as would be ecpected the rural group is less variable than the urban one in each scale.

The data on 825 children's families came through a sample of 36 groups of children identified by their residential zone (urban and rural) and their grades (7 through 12). For each group coefficients of intercorrelations (r_{xy}, r_{xz}, r_{yz}) were worked out among the three scale indexes(Table 6).

Of the 36 groups only about half showed significant correlations between Lx and L_y and also between L_y and L_z, while 32 of the 36 groups showed significant correlations between Lx and L_z (the two-variable indexes). Much more concordance seemed to exist between the two 2-variable scales. Each one can be used to predict the other. However, they in turn did not agree as often with the most reliable scale, namely, L_y.

Table 5

Reliability of Scales L_x, L_y and L_z

	L_x		L_y		L_z	
	Urban	Rural	Urban	Rural	Urban	Rural
Number of observations	698	127	698	127	698	127
Mean Score	4.2	3.4	95.4	85.1	61.2	65.9
Standard deviation	3.7	1.8	15.5	12.2	14.8	11.9
Coefficient of variation (percent)	86.6	54.4	16.1	14.3	24.2	18.1

Table 6

Intercorrelations among L_x, L_y and L_z Scores

Group	r_{xy}	r_{xz}	r_{yz}	Group	r_{xy}	r_{xz}	r_{yz}
1	.18	-.57	-.53	19	.62	-.65	-.76
2	.70	-.66	-.63	20	.63	-.35	-.27
3	.20	-.48	-.50	21	.81	-.80	-.97
4	.55	-.54	-.73	22	.74	-.89	-.52
5	.04	-.42	-.18	23	.37	-.70	-.51
6	.65	-.84	-.59	24	.75	-.69	-.77
7	.33	-.79	-.24	25	.48	-.72	-.50
8	.60	-.73	-.45	26	.39	-.60	-.23
9	.47	-.71	-.52	27	.73	-.89	-.72
10	.33	-.85	-.25	28	.69	-.73	-.40
11	.60	-.80	-.64	29	.40	-.86	-.32
12	.40	-.69	-.43	30	.57	-.61	-.69
13	.28	-.94	-.30	31	.06	-.24	-.48
14	.63	-.85	-.62	32	.22	-.34	-.02
15	.65	-.89	-.65	33	.37	-.85	-.23
16	.66	-.76	-.63	34	.20	-.77	-.42
17	.54	-.89	-.60	35	.45	-.79	-.45
18	.50	-.84	-.49	36	.43	-.75	-.54

Summary of Significance of Correlations

	Number of Groups		
	r_{xy}	r_{xz}	r_{yz}
Significant at 1%	18	30	20
Significant at 5%	5	2	4
Not Significant	13	4	12
	36	36	36

the two 2-variable scales. Each one ca be used to predict the other. However, they in turn did not agree as often with the most reliable scale, namely, L_y.

An overall net correlation (after eliminating the effect of groups) showed (Table 7) that all the intercorrelations among the three scales, were quite high, significantly different from zero at one percent level, although the percent variation explained is very small in magnitude in each case. This is partly so, because the number of degrees of freedom is very large,too. The correlations with L_z are negative because the scale values of L_z are in opposite direction. The net correlations for rural groups are higher in two cases r_{xy} and r_{xz}, but r_{yz} correlations are almost of the same in magnitude for both the zones.

The above analysis indicated that the index L_y which is based on a large number of variables and with relatively graded values is the "best" among the three from view point of the reliability measured by the coefficient of variation; of course, L_z is not very far from L_y but the difficulty of this index would be the fact that it is based on only two variables. The index L_x does not seem however to be recommendable.

In general, in order to select an efficient scale, one must see that the variables are neither too few, nor too many and that the variables should be validly, reliably and easily measurable.

Table 7

Overall correlations among the scales

	Urban		Rural	
Scales	r	$100r^2$	r	$100r^2$
L_x L_y	.272	7.4	.497	24.7
L_x L_z	-.383	14.6	-.675	45.6
L_y L_z	-.519	26.9	-.517	26.7

The graded values for alternatives are preferable and the relative weights of variables should be used. Factor analysis seems to be an appropriate technique to use, the "socio-economic level" being an abstract variable. Modern computing facilities help to a great extent the problem of long and complicated computations of solution of the factor analysis weights(loading) of the variables. For the purpose of this study, therefore, the Council's scale CSE-SEE II (Ly) is used. The results based on this scale are also comparable with Council's previous study results (1966b).

V. Change in Socioeconomic Level

During the last two decades, Puerto Rico has been on the path of a continuous social and economic growth, due to new industrial economy. Looking at the last decade of the 60's one can visualize a great change in the number of variables, which generally influence the socioeconomic level of the families in Puerto Rico.

Urbal-Rural Population

The last census (1970) showed the population of the Island to be 2,712 thousands persons, an increase of 15.4% over the 1960 census, which stood at 2,350 thousands persons. The population growth, of course, is not so much as other nations but its characteristic other has changed during the decade. The people have moved to more urbanized areas. In 1960, the urban population has been 44 percent while the rural was 56 per cent of the total. The situation in 1970 has reversed: 58 per cent of the population lives in the urbanized areas while 42 in rural. In absolute terms, from 1960 to 1970 the rural population has reduced by some 13 per cent while the urban has increased by 52 per cent. The data are summarized in Table 8.

Education Level

The total enrollment in 1970-71 in the schools of Puerto Rico(both public and private) has increased to 752 thousands, 19.2 percent;

the university enrollment is up by 140 percent (Table 9).

The educational level, which is measured by the median school years completed by the population of 25 years of age and over, rose in 1970 to 7th grade from 4.6 in 1960, as per the census reports. This means that half of the persons of age 25 and over had less than 7th grade completed while the other half had a educational level over 7th grade. As shown in Table 10, the percentage of population of 25 years and over with no school education has reduced to 14.4 per cent in 1970, from 23.1 per cent in 1960. During these ten years the per cent having elementary school grades completed has also reduced by about 8 percent points (from 44 to 36 percent) while the population completing higher grades has increased very remarkably. Those completing high school has doubled, from 7.5 percent to 15 percent; while those having completed 4 years or more of college education have reached 6.1 percent in 1970 from 3.5 percent in 1960. This distribution of adult population by school years completed shows an upward trend of social and consequently economic progress. The effect of this educational attainment is expected to be reflected in future occupational, income and other economic characteristics.

Occupational groups

In Table 11, the percent distribution of the population is compared by major occupational group of men and women for 1960 and 1970

Table 8

Change in Population of Puerto Rico
(1960 to 1970)

	Census 1960 (Thous.)	Census 1970 (Thous.)	Percent change over 1960
Total	2,350	2,712	+15.4
Urban	1,039	1,575	+51.6
Rural	1,311	1,137	-13.3

Source: 1960 and 1970 U.S. Census Reports

Table 9

Change in Enrollment in Puerto Rico
(1961 - 1971)

Type of Institution	1960-61	1970-71	Percent change
Schools			
Total	631,079	752,002	+19.2
Public	577,045	680,859	+18.0
Private	54,034	71,143	+31.7
University			
Total	26,540	63,836	+140.5
Public	18,893	42,516	+125.0
Private	7,647	21,320	+178.8

Source: Statistical Reports, Department of Education of Puerto Rico and Central Administration, University of Puerto Rico

Table 10

Educational Attainment, Puerto Rico
(1960 and 1970)

Years of School Completed	Persons 25 years old and over	
	1960 Percent	1970 Percent
None	23.1	14.4
Elementary		
1-6	44.4	36.4
Secondary		
7-11	17.3	22.1
12	7.5	15.0
College		
1-3	4.0	6.0
4 or more	3.5	6.1
No information	0.4	-
Total percent	100.0	100.0
Total number	925,004	1,196,692
Median School Years Completed	4.6	6.9

Source: 1960 and 1970 U.S. Census Report

Table 11

Change in Occupational Groups, Puerto Rico
(1960 to 1970)

Major Occupation Group	Persons employed 14 years old and over			
	1960 Percent		1970 Percent	
	Male	Female	Male	Female
Professional, Technical	5.3	15.2	8.3	17.4
Managers, administrators	8.7	4.1	8.2	3.3
Sales workers	6.8	4.6	7.8	5.0
Clerical workers	4.7	16.4	6.8	21.7
Craftsmen, foremen	14.5	1.6	18.8	2.8
Operatives (no transport)	7.0	28.0	8.3	23.4
Transport operatives	6.8	0.1	7.1	0.3
Laborers (no farm)	8.3	0.7	8.4	1.0
Farmers (farm managers)	4.2	0.3	1.9	0.1
Farm laborers	25.9	1.3	7.9	0.4
Service workers	6.7	11.8	9.3	12.0
Private Households workers	0.3	13.1	0.1	4.5
Occup. not repported	0.9	2.7	7.1	8.0
Total percent	100.0	100.0	100.0	100.0
Total number	416,740	134,916	441,316	197,026

Source: 1960 and 1970 U.S. Census Reports

according to the census. It can be noticed that professional group has more proportion of both sexes in 1970 than in 1960. Women have entered, in addition, to clerical group and have been reduced in household service group. As upward mobility in the occupational scale is quite apparent.

Income Distribution

Quite a significant change has been observed in family income distribution of Puerto Rico during the 60's. The median annual income, according to the 1970 census, rose to $3,063 compared with $1268 in 1960; about two and a half times higher. The population with less than $3,000 yearly income was about 79 percent in 1960 while only 49 percent in 1970 had such a low income. The middle group, (from income $3,000 to less than $10,000) increased from about 19 percent in 1960 to 41 percent in 1970. Table 12 gives detailed distribution.

A substantial increase, too, has been observed in the group with income over $10,000. More than 10 percent of the population in 1970 belonged to this group compared with only 2 percent in 1960.

The above descriptive comparison made between 1960 and 1970 characteristics of the population measured by the main socio-economic factors (namely , education, occupation and income) tend to demonstrate significant change in the level of living of the people in general in Puerto Rico. In the following section, a comparison is made between the socio-economic level (SEL) of the school children's families.

Table 12

Change in Family Income, Puerto Rico
(1960 - 1979)

Annual Family Income	Families 1960 Percent	1970 Percent
Less than $500	24.9	12.7
$500 to 699	7.9	3.5
$700 to 999	9.6	5.1
$1,000 to 1,999	23.5	13.8
$2,000 to 2,999	12.9	14.1
Less than 3,000	78.8	49.2
$3,000 to 3,999	7.0	11.4
$4,000 to 4,999	4.4	8.3
$5,000 to 5,999	2.6	6.3
$6,000 to 9,999	4.6	14.5
$3,000 to 9,999	18.6	40.5
$10,000 to 14,999	1.4	6.3
$15,000 or more	0.7	4.0
$ 10,000 or more	2.1	10.3
Not Reported	0.5	4.0
Total Percent	100.0	100.0
All Families	447,932	564,751
Median Income	$ 1,268	$ 3,063

Source: 1960 and 1970 U.S. Census Reports

Socio-Economic Level of School Children

For the purpose of measuring the change, if any, occurred in the socioeconomic level (SEL) of school children during the last decade, the Superior Educational Council's SEL - scale (CSE - SEE - II) is utilized. The same scale was used to measure the SEL of school children in the Council's 1966 study for which the data were collected in 1962. That analysis was based on a subsample of 1561 students from a master sample of some 7800, representative of both public (urban, rural) and private schools of Puerto Rico. The scale is based on 32 variables measuring social and economic aspects of the individual and was arrived at by using factor analysis Principal Component Method suggested by Hotelling (1933). The communality (variation explained by the 32 variables) of the scale is 45 percent, giving the Multiple correlation Coefficient of 0.67 among the variables and the SEL Index. The scale is standarized to yield an expected mean score of 100. The standard deviation is estimated to be 23.3.

The comparative data for the present study was obtained, as explained earlier, through a sample of 884 students from 31 groups belonging to three different types of schools, namely, public urban, public rural and private. The students were(selected from the 7 to 12th grades) during the months of February to April 1973. The composition of the group in the sample is given in Table 13 along with the mean SEL score for each.

In order to compare the SEL of the 1962 data (from the 1966 study) with

Table 13

Mean Socio-economic Level (SEL) score and Reading Comprehension (RC) Score for 31 Groups in the Sample

Sample Group Identification					Number of pupils	Mean SEL Score	Mean (RC) Score
Region	District	School Type	Rural Urban Zone	Grade			
I	1	pub	R	7	30	99	22.3
		pub	U	10	36	110	34.8
	2	pub	R	7	33	93	21.9
		pub	R	12	12	91	30.9
		pub	U	9	31	104	30.7
	3	priv.	U	11	27	129	35.3
		priv.	U	7	27	127	28.0
II	1	pub	R	8	23	99	20.0
		pub	U	10	21	104	27.9
	2	pub	U	7	38	111	21.2
		pub	U	12	33	116	33.1
III	1	priv.	U	7	36	124	28.3
	2	pub	U	7	28	108	21.3
	3	pub	U	10	21	107	28.8
		pub	U	11	16	100	21.7
IV	1	pub	U	9	19	106	27.1
		pub	U	11	23	107	34.0
		pub	U	12	23	102	32.0
	2	pub	R	7	32	94	24.8
V	1	pub	R	9	18	86	21.9
	2	pub	U	7	33	94	25.9
		pub	U	12	24	114	33.3

(continue next page)

Table 13 (continued)

Mean Socio-economic Level (SEL) Score and Reading Comprehension (RC) Score for 31 Groups in the Sample

Sample Group Identification					Number of pupils	Mean SEL Score	Mean (RC) Score
Region	District	School Type	Rural Urban Zone	Grade			
VI	1	pub	R	9	29	99	21.1
	2	pub	U	10	38	110	34.8
		pub	U	10	32	100	35.4
		priv	U	10	45	130	40.4
	3	pub	U	8	33	122	24.9
		pub	U	11	19	105	29.6
	4	priv	U	7	40	127	32.0
	5	priv	U	7	30	128	26.5
	6	pub	U	7	34	97	18.2
Total					884		

the 1973 data, the SEL score were grouped according to the school type. Table 14 gives the summary of the Means, Standard deviation and other related statistical estimates for the two years (1962 and 1973) for each school type. Also given are the corresponding estimates for the total (all school types) after giving proper weights in proportion to the enrollment in each school, because the sample size by school type disproportionate as explained in the section on Methodology.

It can be noted that during the period of about 10 years, the SEL score for families of school children shows a general increase of about 9 points from 1962 to 1973 (98.4 to 107.3). The minimum score has increased from 58 to 68 while the maximum score shows an increase of only 3 points (from 148 to 151). The small increase on the upper side of the scale is usual, as it is the part of "saturation". The coefficient of variation has reduced to 12.9 percent of the mean in 1973 from 23.6 percent in 1962, indicating that the variation among the SEL score in general is less than a decade earlier. The gap between the two extremes seems to have reduced.

The greatest change in SEL is observed in the case of families of children in public rural schools. From a very low mean SEL score of 75.8 the score has reached to 95.0, quite close to the theoretical 100 average score. This is a gain of almost 20 points on an average. We can also observed that the lowest scoring families, now have an index of 69 instead of 58 while the upper group has reach 135, a gain of 14 points. The gain among all different level groups in this school type,

however, has been fairly uniform, as can be inferred from a very little reduction within coefficient of variation (15.2 in 1962, and 13.8 in 1973).

The public urban schools also show significant increase in the mean SEL score (93.9 to 106.8) during this period, although the maximum score has reduced by 6 points, and the minimum has increased by 8 points. This variation pattern has resulted into a slightly more homogeneous group in 1973 than ten years ago. (Coefficient variation 13.5 in 1973 compared with 19.0 in 1962).

The private school pupils in 1973 have remained on the highest SELas in 1962 compared with their brethren in the public schools. However, the SEL mean scores show an increase of only 6 points, while the public urban and public rural mean SEL scores had significant increase of 13 and 19 points respectively. In the case of private schools, the minimum score in 1973 jumped by 29 points, reaching to 95, which is the same as the 1973 average of the public rural schools. The maximum, however, moved upward by only 3 points, reaching to a score of 151. This substantial upward mobility of the lower group in private schools without much movement of the higher group, made the private school children's family much more homogeneous than other groups. This can be seen from a low coefficient of variation of 7.8 percent in 1973.

In Table 15, the SEL scores of the two samples (1962 and 1973) are distributed by the 7 SEL classification as suggested by the Council's 1966 study. The distribution of scores for all types of schools combined (with

Table 14

Comparison of Mean SEL Score by School Type
(1962, 1973)

	Public Urban		Public Rural		Private		All Schools	
	1962	1973	1962	1973	1962	1973	1962	1973
Sample Size	706	502	355	177	500	205	1561	884
Mean SEL Score	93.89	106.78	75.81	95.03	121.07	127.39	98.44	107.27
Minimum SEL	60	68	58	69	66	95	58	68
Maximum SEL	147	141	121	135	148	151	148	151
Standard Deviation	17.8	14.4	11.5	13.1	15.5	9.9	23.3	13.8
Coefficient Variation (percent)	19.0	13.5	15.2	13.8	12.8	7.8	23.6	12.9
Standard Error of mean	0.67	0.64	0.61	0.98	0.69	0.69	0.59	0.46

Source: 1962 data from Superior Educational Council's 1966 Study; Scale CSE-SEE-II

Table 15

Comparison of Percent Distribution of SEL Score by School Type (1962,1973)

		Public Urban		Public Rural		Private		All Schools	
Classification	Score	1962	1973	1962	1973	1962	1973	1962	1973
		Percent		Percent		Percent		Percent	
Very High	138 or more	0.4	1.6	-	-	9.4	12.7	3.2	2.6
High	128 - 137	2.6	5.8	-	1.7	31.3	41.9	11.1	9.1
Med. High	111 - 127	17.6	33.8	1.1	10.7	37.7	40.0	20.2	31.1
Medium	87 - 110	41.6	50.6	14.6	60.4	17.4	5.4	27.9	47.1
Med.Low	74 - 86	23.4	7.6	31.2	24.9	3.4	-	18.8	9.4
Low	68 - 73	8.2	0.6	29.2	2.3	0.6	-	10.6	0.7
Very Low	67 or less	5.9	-	23.9	-	0.2	-	8.2	-
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.00	100.0

appropriate weighting applied) shows that in 1973, a substantial increase has occurred in the "medium" and "medium high" group. In 1962, the total of these groups was about 48 percent; in 1973, it is about 78 percent. The "high" and the "very high" group has decreased slightly while the "medium low" and "low" groups have reduced substantially. The lowest group has apparently disappeared in 1973.

Looking into the different school types, public urban schools show about the same upward rise as the total, namely, a substantial increase in "medium high" and "medium" and also in the two upper groups. Compensating this increase, there is a reduction in the lower groups.

The rural school group has moved to "medium" and other upper classifications up to "High" in 1973 amounting to a total of about 73 percent (60 percent in medium) while in 1962, it had only about 16 percent with "medium" or higher classification. Only 27 percent in 1973 is "medium low" or "low" compared with about 84 percent in 1962.

The private schools show relatively smaller change, although this group, too, has moved upward. Practically 95 percent are "medium high" and "higher" in 1973 compared with 78 percent in 1962. The "medium" and the lower groups are reduced to only 5 percent in 1973 compared with 22 percent ten years earlier.

The overall analysis indicated that the SEL of the school children's families, in general, has moved to about two upper classifications on

the scale during the last ten years. Similar changes to a slightly more or less extent, are also found to have occurred in all three school types of Puerto Rico. The changes have been significant.

VI. Relation between SEL and Reading Comprehension

As indicated in the beginning of this report, one of the purposes of this study was to see if there is any relationship between socio-economic factors and specific academic indices. It was purposed in the design of the project to study this relationship with various indices, such as grade-point average, scores in specific subject matter tests, general ability index and others. However, as already indicated in the section on the methodology, it was found impossible to obtain uniformly graded indices on any of the subject matter or trait from the different groups representative of the Puerto Rican schools. This was so, because it was found, on collecting the relevant data for this purpose that the schools were not following a uniform practice in grading student's performance or that different tests were used by different schools to measure the same characteristics. The tests, agair, were not all standardized for Puerto Rico in general. Most of the tests were made by teachers and there was no way to establish any equivalent scores in order to measure the relationship proposed.

For this reason, the former officials of the Council who were specialized in testing, were consulted by the project director and on their advice, it was decided to administer all the students the Reading Comprehensive Test prepared and standardized for Puerto Rico by the Superior Educational Council. The test for theIntermediate grades (7, 8 and 9) is the CSE Prueba de Comprensión de Lectura Nivel 3 (Council's Reading Comprehension Test - Level 3)

and the one for the High School grades (10, 11 and 12) Level 4.

The tests were administered to the respective groups of the two school levels. The sample was the same 31 groups, totalling to 884 students of the public and private schools of Puerto Rico, who were also asked to fill out the socio-economic questionnaire for the SEL score, so that the relationship can be studied between the two variables (SEL and Reading Comprehension Score).

Comparison of Reading Score

In Table 16, basic statistical computations are given for the Intermediate groups (7, 8 and 9th grades) of the three types of schools, namely, public urban, public rural and private. Also given are the corresponding estimates for the three school types combined after applying necessary weighting to the three samples.

The average score in Reading Comprehension (RC) of the 514 students in the sample representing the Intermediate grades is 24.63 maximum possible is 45; standard Deviation is .00. The mean RC scores for the three schools are significantly different among themselves, the private school having the highest mean score of 8.93 with the S.E. of the mean 0.694. As could be expected, the rural groups have the lowest mean score. The urban mean is slightly higher (but significantly) than the rural.

The High School test has a maximum possible score of 58 points. The average of the 14 groups making a total of 370 students turned out to be 33.40. The Private School, once again, has the highest score of 38.46

Table 16

Comparison of Mean RC Score by School Type

	Public Urban	Public Rural	Private	Total
Intermediate Grades				
Number of pupils (n)	216	165	133	514
Mean RC Score	23.91	22.12	28.93	24.63
Standard Deviation				8.00
Coefficient of Variation (percent)				32.5%
Standard Error of Mean	0.54	0.62	0.69	0.35
Mean SEL Score	106.0	95.4	126.3	107.8
High School Grades				
Number of pupils (n)	286	12	72	370
Mean RC Score	32.23	30.92	38.46	33.40
Standard Deviation				9.48
Coefficient of Variation (percent)				28.4%
Standard Error of Mean	0.56	2.74	1.12	0.49
Mean SEL Score	107.4	90.6	129.36	111.11

and is significantly different from the mean scores of the public schools both urban and rural.

The difference between the urban and rural group mean RC scores is not significant, however. It whould be noted that there is only one rural high school in Puerto Rico and hence the above comparison may not be conclusive of the situation.

SEL and RC Scores

As we explained earlier, the Council SEL Scale II was selected to measure a composite index of SEL instead of taking individual variables such as income or occupation or education or such other similar variables. The reason is that eventhough it may be possible to establish relationship of RC score with each variable at a time, the interpretation in general will be quite difficult, if not impossible. In earlier part of this report, it is established that a composite index of the SEL is better than one single variable, due to its stability and uniformity of measurement of SEL. The procedure utilized to arrive at the correlation between the SEL Index and RC score is essentially the same as the multiple regression approach of RC Score on the variables in the SEL Scale. The advantage is that the SEL Index by itself becomes a variable and can be used to compare groups among themselves as to their SEL's, as is done in this report.

For the purpose of establishing relationship between SEL Index and RC score, each individual students in the sample were administered

the Questionnaire and the corresponding test. Pearson's product-moment correlation coefficient (r) was calculated for the Intermediate group students (514 in the sample). The coefficient r is .310 with a standard error of .042. The coefficient is highly significant, due to a large number of degrees of freedom provided by the sample. The estimation equation for the two variables, for the Intermediate grades is:

RC score = 9.38 + 0.1415 (SEL score).

Table 17 summarizes the important estimates related to correlation.

In case of the High Schol grades (10,11 and 12), the test was a different one, as explained earlier. So a separate set of calculations were made to establish the correlation between RC Score and SEL score. The coefficient of correlation (r) using a sample of 370 students turned out to be .288 with a standard error of .050. The correlation is proved to be highly significant for the sample.

The equation to estimate the High School grader's RC score for known value of SEL score is:

RC score = 15.08 + 0.1649 (SEL score)

The estimates related to this correlation are summarized in Table 17.

As can be seen from both these correlation analyses that the socio-economic factors do influence the RC scores significantly. In case of the Intermediate graders, for every 10 points difference above or below the SEL mean score the RC score will change by 1.4 points. A student coming

Table 17

Coefficient of Correlation (r) between SEL and RC Scores

	Intermediate Grades	High School Grades
Number of pupils (n)	515	370
Coefficient of Correlation(r)	0.310	0.288
Standard Error of r	0.042	0.050
Coefficient of Determination	0.096	0.083
Constant of Equation	9.3756	15.0810
Coefficient of Regression	0.1415	0.1649
Standard Error of Estimate	7.61	9.09
Significant (**) at 1%	**	**
Not significant(NS) at 5%		

Table 18

Mean SEL and RC Scores by School Type

	Intermediate		High	
School Type	SEL Mean Score	RC Mean Score	SEL Mean Score	RC Mean Score
Public Rural	95.4	22.12	90.6	30.92
Public Urban	106.0	23.91	107.4	32.23
Private	126.3	28.93	129.4	38.46

from a medium SEL, would have a RC score around 24.

For High School the change in the RC score would be approximately 1.65 points for every difference of 10 points above or below the SEL mean score. The RC score of a student from the medium class is estimated to be 33.

For the purpose of having some idea of the public and private schools, Table 18 also gives the mean RC scores and SEL score by school types. The rural, urban and private schools have their RC and SEL scores in the same order from lowest to highest respectively. This is true for both Intermediate and High School students.

Also a glance at the mean SEL scores and the RC scores calculated for the 17 Intermediate and 14 High school groups in Table 13 gives a similar idea of the positive correlation between the two variables.

VII. Socio-economic Level and School Drop- Out

The students who are enrolled in a school system but leave it before completing the school year always have been a concern of the educators, sociologis and other research workers. Teachers, counsellors and social workers have tried to retain them or bring them back to the school after studying individual cases . The drop-out of school children, no doubt, is a problem that must be attended not only by the schools but also by other agencies and organizations, and particularly by the parents or guardians of the students. The effects of dropping out of school have been felt in various situations. Many of the students themselves have not been able to do what they thought they would after dropping-out. Parents have not been happy either with the child leaving studies prematurely. The country suffers from lack of human resources with proper academic preparation for its social and economic progress. Juvenile delinquency and other similar modern-age social problems are created, in many of which the drop-outs are found to have been involved.

In Puerto Rico, the problem of drop-out has been a concern of the Department of Education and other agencies of the government for a number of years. With necessary studies and implementarion of several measures, the problem is not very serious now, although it still continues to be one of the many other problems, where the magnitude of the drop-outs is not as important as the characteristics of the individuals involved.

A study of the problem of drop-out in public school of Puerto Rico, jointly undertaken by the Superior Educational Council's Division of Educational Research and the Department of Education in 1957-58 and published in 1964 is, probably the first and the only one of its kind conducted as of the present in Puerto Rico. The study was made with a matched control group of "no drop-outs" of the public schools. A substantial amount of controlled variables such as urban-rural zones, elementary and secondary grades and others were also taken into consideration.

The results of the study brought out very important aspects of the problems. Among them, it was revealed that the most important characteristic of the drop-outs was that they come from very poor socio-economic conditions, not only with respect to the income but also in other related factors. Parents of a large proportion of the drop-outs were unemployed or had irregular jobs. Their attitude towards work was not always positive nor were they enthusiastic toward economic or other type of progress. Many of them lacked good working habits and capacity of work. Illness in the family of drop-outs was also one of problems mentioned. Conflicting situation between father and mother would result in one of them leaving the family; consequently the child's study would be interrupted.

The study showed that in general the socio-economic factors were more responsible for the children's dropping out of school than the academic grades. Over 25 percent of the families of the drop-outs had their socio-economic situation such that it would not permit the children to go to school;

about 14 percent had dropped out of school because of low grades. The school, in some cases, was too far and the parents could not provide necessary transportation. In several cases, the child was needed to help the mother or the guardian in the household duties. A considerable proportion of drop-outs desired to work rather than study while some others were obliged to work out for the family.

These and some other factors, which were directly or indirectly responsible for the drop-outs, are the variables measuring socio-economic level of the person. The SEL scale which the Council prepared and is used in this study, contains many of these factors in its formula as has already been mentioned earlier and is shown in Tables 1 and 2.

In the previous sections of our study, we saw that the socio-economic levels are different for different types of schools, public urban, public rural and private. If, therefore, the SEL is one of the factors related negatively to the drop-out rate, then one would expect that the different types of schools would have drop-out rates changing inversely with their SEL's. In Table 19, the drop-out rates by the three types of schools are presented for the years, 1962 and 1971, 1972 and 1973; while in Table 20, the 1962 and 1973 drop-out rates are compared with the mean SEL scores of the school types.

Table 19

Drop-out rates[1/] by Types of School, Puerto Rico
1962, 1971, 1972, 1973)

Year	Intermediate			High School		
	Public Urban	Public Rural Percent	Private	Public Urban	Public Rural Percent	Private
1962	8.4	9.4	1.50	9.3	10.6	1.80
.	.	.	.	.	.	.
.	.	.	.	.	.	.
1971	7.1	7.4	0.73	7.5	9.3	0.80
1972	7.2	7.1	0.69	7.5	8.3	0.87
1973	6.8	7.2	0.58	7.9	8.2	0.61

1/ Number of students dropping out as percent of the enrollment.

Source: Puerto Rico Department of Education, Annual Statistical Report

Table 20

Relationship between Mean SEL Score and
Drop-Out Rates (7-12 Grades)
Puerto Rico
1962 and 1973

School Type	1962		1973	
	Mean SEL score	Percent Drop-out	Mean SEL score	Percent Drop-out
Public Rural	76	9.5	95	7.3
Public Urban	94	8.8	107	7.4
Private	121	1.7	127	0.59

As mentioned earlier, the drop-out rates have decreased, in general, within the Intermediate and High Schools of all schools types during the ten-year period. At the same time SEL has increased, too, in the same direction. Private schools have a very low drop-out rate compared with the public schools. The High school grades have a slightly higher rate than the Intermediate grades, which may, partly, be due to working desire and opportunity to the High school students because of their age.

The data in Table 20 show a clear negative relationship between the SEL score and the drop-out rate of the students of 7to 12 grades. It is observed that the higher the SEL level, the lower is the tendency to drop-out. This is true for both the years (1962 and 1973) for which the data on SEL score were available.

The above analysis of the factors affecting the drop-out rates demonstrates that, the SEL has a negative correlation with the deop-out percent. During the years when the SEL has increased for all school types, the drop-out rate has decreased. This, of course, should not be interpreted as the absolute "cause and effect" relationship. Socio-economic level does not directly cause the drop-out. Socio-economic conditions could indirectly be part of the cause of drop-outs, as that factor was the most frequently mentioned single reason for leaving school in Puerto Rico according to the Council study cited earlier.

In this study, only an attempt is made to demonstrate how SEL could have been related to the dropping our of students from the school. For a more thorough study of this relationship (between SEL and drop-out) , it is necessary to have a special study made by school districts for example where SEL score could be obtained on a sample basis for individual students dropping out and a control grouped (not dropped out). The control group should not be matched by socio-economic level nor by income in order to test its effects.

VIII. Socio-economic Level and Higher Education

As is shown in earlier sections, the socio-economic level (SEL) has some effect, direct or indirect, on educational factors. The differences in SEL of the students were seen through the school system in Puerto Rico, where the public rural school students have the lowest SEL while the private school has the highest. The "consequences" of these differences in SEL's at the school level is noticed when the high school graduates seek admission to the institutions of higher education, where, usually, the students are considered for admission on the basis of their academic performance and of their aptitude for college level studies.

Admission Problem at a State University

Taking an example of Puerto Rico, we can see how these consequences play their part at the university level. In Puerto Rico, there is one state supported university (The University of Puerto Rico) with 3 main campuses and one complex of regional and junior colleges throughout the Island. The total enrollment of the University of Puerto Rico in 1973-74 was 50,439. There are also some private institutions of higher education which enrolled a total of 37, 815 students in the same year. The ratio of the public to private sector is thus, 6 to 4. This ratio some 12 years ago, in 1961, stood at 7 to 3 when the total enrollment in University of Puerto Rico was 21,262 and in private universities only 8,911. The public sector has

more than doubled the enrollment during the last 12 years, whereas the private one has it four times.

The public university is supported by the state and hence the admission of new students in the freshmen class has to rely on the budget appropriation by the Legislature of Puerto Rico. For the last several years the admission has been limited due to increasing demand for entrance and lack of enough facilities for all. According to the records of the Division of Statistics of the University Central Administration, about 33,000 applications (counting applications to more than one campus) from some 12000 different high school students were received for admission to the freshmen class in Fall, 1973. Of these, 14,400 were accepted and notified for admission. Some 9,00 these enrolled as freshmen at different campuses of the University.

SEL and Admission

At the "main" campus of Río Piedras, 9,152 applications were received in 1973-74, of which 4,774 were accepted for admission. The students actually enrolled in Fall, 1973 were 2,795. This indicates that about 52 students out of 100 applicants were admitted while 30 of these really enrolled.

The students are selected, mainly on the basis of a combined index of their high school average and the performance in an aptitude test, generally of the College Entrance Examination Board (CEEB). When one

enters into further analysis by the public and private schools, it is realized that due to the positive relationship that exists between SEL and the academic achievement and related traits it appears that the criteria of selecting the students on the basis of such a composite academic aptitude index is "biased" from the view point of different SEL's of students. This criteria, based on students scores, seems to be "discriminating" the high school graduates of the lower economic sector; and as the SEL of the public and the private schools are different, it would appear as if the number of students from the public school system to be admitted in the state university is "restricted".

Table 21 shows, as an example,the data for Río Piedras Campus corresponding to admissions in 1973 Fall. Of the 1952 total applicants, 72 percent were graduates from the public high schools and 28 percent were from the private ones. Of the 4,774, who received admission 64 percent were the graduates from the public schools while 36 percent were from the private. As the selection of student's for admission is based on the academic and aptitude index, the public school graduates had less probability to be admitted than those of the private due to their lower index, in general. However, the actual enrollment proportion of public and private differed very slightly from those admitted. A slightly smaller public school

Table 21

Applications, Admissions and Enrollment
To the Freshmen class at
Rio Piedras Campus, U.P.R.
(1973-74)

School type and Income group	Applications		Admissions		Enrollment	
	Number	Percent	Number	Percent	Number	Percent
Total	9,152	100.0	4,774	100.0	2,795	100.0
Public	6,630	72.4	3,047	63.8	1,720	61.5
Private	2,522	27.6	1,727	36.2	1,075	38.5
High (10,000+)						
Total	1,368	100.0	1,277	100.0	777	100.0
Public	578	30.9	314	24.6	200	25.7
Private	1,290	69.1	963	75.4	577	74.3
Medium ($3,000-9,999)						
Total	4,357	100.0	2,181	100.0	1,327	100.0
Public	3,345	76.8	1,533	70.3	896	67.5
Private	1,012	23.2	648	29.7	431	32.5
Low (less than $3,000)						
Total	2,927	100.0	1,316	100.0	691	100.0
Public	2,707	92.5	1,200	91.2	624	90.3
Private	220	7.5	116	8.8	67	9.7

Source: Rio Piedras Campus, Planning Office through Statistics Division of the Central Administration.

graduates (56.4 percent) enrolled eventhough they were admitted, compared with the private school graduates (62.2 percent). The absolute number of public (1720) is greater than that of private (1075). The lower enrollment by graduates of both type of school could be due to their joining another campus or another university or due to lack of funds for payment of fees and for other expenses.

Income Distribution of Applicants

The information on income obtained from the high school graduates at the time of their application to the Río Piedras Campus, revealed that 1868 of the 9,152 applicants belonged to families with income over $10,000 a year. Of these, 69 percent were the private school graduates. On the other hand, among the middle-($3,000-$9,999) and lower groups income (below $3,000), therewere 77 percent and 93 percent of enrollees respectively from the public schools. This does show a contrasting picture.

However, when we see the admission group, in all income classes, private school graduates qualified to the admitted are in larger proportion than the public school graduates. Enrolled students proportion is the same as the admitted proportion except the middle group public school graduates who enrolled in a smaller proportion than the private ones.

Some Alternatives

Taking into consideration the situation such as that given in the above example of Río Piedras Campus, one would see that the "discrimination" towards the lower-income group graduates is an effect purely "confounded" with the lower academic level, due to the correlation that exists between the SEL and academic level. The question that arises, then, is whether it really is true that such a discrimination exists; and if it does, one would ask why it exists and if there is any solution to eliminate it.

The answers to these questions are many but not easy. They depend foundamentally upon two other questions. The first one is: what are the objectives or purposes of the university for which the problem is studied; and the second one is: according to these objectives, what kind of student population is expected to be served by the university.

The objectives of a university is generally found to have been postulated in the university laws or statutes; and of course based on them, the student population is determined. However, in order to determine the students selection, a number of important points should be taken into consideration. Some of these are:

(a) The students who are admitted based on certain criteria but later may not be able to complete the university study satisfactorily may undergo a psychological frustration. This condition is probably more harmful than not to have a

college education, if not admitted.

(2) The university education is meant not only for developing general capacity of the person but also is planned to prepare students for specific professional or other type of services.

For this purpose, naturally, the candidates to be admitted must possess the minimum level of aptitude and probably, experience necessary for his proposed academic or vocational career.

(3) Many of the universities, and in particular the state universities, such as the University of Puerto Rico have very limited economic and human resources for the demand and therefore it would be expected that these resources are utilized to their best towards achieving institution's goals. Hence the selection of the students should be such that there are no unnecessary expenses nor there is unnecessary investment in candidate who are not likely to complete their studies.

(4) A university, particularly, the public one must have a policy that would be, in conformation with its objectives and, try to have it equitable in such a way that an equal opportunity is given to all these who are qualified on the basis of their demonstrated capacity and merits. In fact, the present policy

of admission at the University of Puerto Rico cannot be considered to be the one that excludes those who desire admission, but it is the one that inclines towards attracting those who have good probabilities of achieving success. This success is shown to be related and predictable by the academic indices and the results of aptitude tests.

Now, if the factors mentioned above are not taken into consideration, other alternatives have to be considered, with of course, the possible consequences. To illustrate some of these alternatives, let us take, again, the example of the Río Piedras Campus where, in 1972-73, according to the records of the Central Administration Planning Office, a total of about 4,400 students were offered admission. Let us consider that this is the maximum capacity of the campus for freshmen.

The number of students applying was 11,774, all of whom have the minimum requirement of the high school average. Of these, there were 2,897 private high school graduates and the rest 8,759, the public ones. The annual family income of these students is given in Table 22. The median income of the public high school graduates was estimated to be $3,309 while that of the private ones was about $9,600.

Suppose now that the admission policy of the Campus in to admit first all the low income group students irrespective of the other consideration. We can see from Table 22, that the 4,400 students to be admitted would

Table 22
Family Income Distribution of Applicants
to Freshmen Class at
Río Piedras Campus
(1972-73)

Income Group	School Type						Total	
	Private		Public		No information			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than $500	11	.4	254	2.9			265	2.3
$500 - 749	8	.3	220	2.5	-	-	228	1.9
750 - 999	13	.4	276	3.2	-	-	289	2.5
1000 - 1499	41	1.4	736	8.4	-	-	777	6.5
1500 - 1999	29	1.0	642	7.3	-	-	671	5.6
2000 - 2999	87	3.0	1,226	14.0	1	.8	1,314	11.2
3000 - 3999	161	5.6	1,138	13.0	-	-	1,299	11.0
4000 - 4999	190	6.6	856	9.8	-	-	1,046	8.9
5000 - 7499	410	14.2	953	10.9	-	-	1,363	11.7
7500 - 9999	427	14.7	469	5.4	-	-	896	7.8
10000 - 12499	422	14.6	309	3.5	-	-	731	6.2
12500 - 14999	208	7.2	132	1.5	-	-	340	2.8
15000 - 17499	187	6.5	87	1.0	-	-	274	2.3
17500 - 19999	116	4.0	47	.5	-	-	163	1.4
20000 more	316	10.9	65	.7	-	-	381	3.2
No information	271	9.4	1,349	15.4	177	99.2	1,737	14.7
Total	2,897	100.0	8,759	100.0	188	100.0	11,774	100.0
Mean	$10,959		$4,407				$6,121	
Median	$ 9,625		$3,308				$4.167	

Source: Division Statistics, Central Administration.

all come from families with income of about $3,300 or less. (This is slightly higher than the median family income of Puerto Rico, $3,063, from 1970 Census). Under this criteria only about 300 students (or 7 percent) from the private schools and some 4,100 (or 93 percent) from the public schools would qualify to enter the university as freshmen. The consequences of this criteria for admission would be that the university would be an institution of higher education for only the poor class, creating a "discrimination", if we use that word, towards part of population for which a state university has equal responsibility. If we accept that the SEL and the educational achievement are related, the university will have students who would not probably have standards required for certain careers.

On the other extreme, if the admission policy would be to give chance first to those on the top of the income scale, the administration would be admitting 4,400 students (its maximum capacity), from families with income over $4,700/- a year. The freshmen student body, then, would consist of some 2,450 graduates from the private schools and about 1,850 from the public schools. The consequences of using this criteria of admission would be the same as the previous example: a discrimination against a group of graduates from poor families who, probably, cannot afford the expensive private university education.

Another alternative would be to admit only the public school graduates. In this case, there would not be any chance at all for the private school graduates, as there are 8,759 public graduates from public schools, which is already more than that could be accommodated in the university. The consequences would be that the country and the University which are both responsible to provide higher education to all, would be discriminating againt all those who graduate from the private schools and against some from public schools who have high income. It will not be a surprise to see that the parents of children in the private schools will send them to the public ones at least in their last couple of years of the high schools, so that they would have some assurance of admission to the public university.

Admitting first the graduates from the private schools, on the other hand, would admit only few from the public schools (around 1,500) and all (2,900) for the private schools.

SEL and Entrance Index

One can think of many other alternatives and try to analyze the consequences. It will be observed that any type of situation is going to create some problem. It is realized that there is "discrimination" of some sort in any kind of admission policy of a university, particularly, from the viewpoint of the type of school and the SEL which are related in the same way as SEL with the academic achievement.

Table 23
Family Income Distribution of Students Admitted
to Freshmen Class at
Río Piedras Campus
(1972-73)

Income Group	School Type							
	Private		Public		No information		Total	
	Number	Percent *	Number	Percent*	Number	Percent*	Number	Percent*
Less than $500	1	9.1	37	14.6	-	-	38	14.3
500 a 749	3	37.5	51	23.2	-	-	54	23.7
750 a 999	8	61.5	69	25.0	-	-	77	26.6
1000 a 1499	16	39.0	205	27.9	-	-	221	28.4
1500 a 1999	4	13.8	195	30.4	-	-	199	30.9
2000 a 2999	27	31.0	386	31.5	1	100.0	414	31.5
3000 a 3999	68	42.2	353	31.0	-	-	421	32.4
4000 a 4999	77	40.5	265	31.0	-	-	342	32.7
5000 a 7499	197	48.0	334	35.0	-	-	531	39.0
7500 a 9,999	212	49.6	178	38.0	-	-	390	43.5
10000 a 12499	248	58.8	137	44.3	-	-	385	52.7
12500 a 14999	143	68.8	57	43.2	-	-	200	58.8
15000 a 17499	112	59.9	46	52.9	-	-	158	57.7
17500 a 19999	78	67.2	21	44.7	-	-	99	60.7
20,000 or more	213	67.4	38	58.5	-	-	251	65.9
No information	140	51.7	416	30.8	30	25.6	586	33.7
Total	1,547	53.4	2,788	31.8	31	26.3	4,366	37.1
Mean	$12,181		$5,208				$7,737	
Median	$10,915		$3,688				$5,583	

Source: Division of Statistics, Central Administration.

* Percent represents percent of applicants admitted.

It would be worthwhile to know that in the example of the Río Piedras Campus, the university admitted 4,366 students in 1972-73 based on their combined academic index. These students income distribution is shown in Table 73 by public and private high schools from where they graduated. It can be noted from the table that there does exist a correlation between income and the academic index due to the fact that a higher proportion of students from higher income group were eligible for admission.

It is not the purpose of this study to suggest what the policy of a university should be with regards to admission of the first year students; but it could be stated that in the light of such a situation, it is of course up to the university to see that, on one hand, it adapts a policy such that the adverse conditions for any sector are reduced to a minimum in order to achieve the objectives which are laid down as its goals; while on the other hand, the state should take steps to equalize educational facilities, socio-economic levels and other factors which tend to create stratification in a developing society.

X. Summary, Conclusions and Recommendations

Summary

A number of socio-economic indicators are used for evaluating the needs of a country. Particularly underdeveloped and developing nations have to know how much importance should be given to various aspects of the program in which the progress is desired. On the local level a state of a nation needs to improve the existing program or to plan a new one; for this purpose it is necessary to study indicators which would guide planners and administrators to evaluate the present situation and project for the future.

One of the most important factors influencing the progress of a country is the educational level of its people. This in turn is influenced by the facilities available for this purpose in the state and also by the individuals' traits. A number of studies have shown that the individual's educational ability and aptitude are greatly influenced by its socio-economic environment. In Puerto Rico the studies made by the Division of Educational Research of the former Superior Educational Council of the University of Puerto Rico have dealt with the problem of measuring socio-economic level (SEL) of families of students and its relation with educational factors. The Division has prepared several instruments and scales for this purpose. However, with the passing of time in a dynamic society such as that of Puerto Rico, the instruments have to be checked for its validity and

reliability and the correlation study between the variables needs to be continued.

The purpose of this project is to study if there has been any changes in the SEL of the families of school children in the last 10 years and to study its effect on selected educational variables. The variables considered in this study are the reading comprehension, school drop-out and admission to the institutions of higher education.

The instrument used for measuring socio-economic level is the SEL scale CSE-SEE-II of the Division of Educational Research of the Council. It is demostrated that this scale is better than the other two scales based on a two-factor index. The test used for reading comprehesion is also the Council's Reading Comprehension Test, Form A, for intermediate and high school students.

The data utilized for comparing the scales were collected in 1966 for the research project of the Council for the same purpose. The data for studying the correlation between SEL and RC scores was collected in 1973 (spring semester) from a probability sample of 884 students representative of the intermediate and high school students of the public and the private schools of Puerto Rico. The sample was stratified by school regions, urban and rural zone.

For the selection of the scale, intercorrelations and variability were analyzed. On the basis of this analysis, it was decided that the council's CSE-SEE-II scale was better adapted for the purpose of the study.

Applying this scale to data of 1962 and of 1973, it was observed that, the SEL of the school children showed a general increase of about 9 points (98.1 to 107.3), showing a larger increase on the lower end of the scale. The greatest change was observed among the students of the public rural schools (from 75.8 to 95.0), bringing them closer to the theoretical average (100) of the scale. The public urban school level increased by 13 points (93.9 to 106.8) and the private school students showed 7 points increase. The SEL score of the private school students, however, was the highest among the three types of schools, in 1962 as well as in 1973.

The SEL score of 1973 was correlated with the comprehension score. The correlation was positive and highly significant for the students of Intermediate and also of the High School levels. The relationship showed that the score in the RC in the Intermediate Test would change by about 1.4 points in general, for every 10 points difference in the SEL score. In the High School test score the change was estimated to be 1.6 points. It was observed that the RC score was lowest for public rural schools and highest for the private schools. The differences among the mean scores of the three school types were significant.

The study also demonstrates that the school drop-out rate has decreased during the last 10 years, while at the same time the SEL has increased. Also shown is the fact that the private school drop-out rate has continued to be very low compared to the rates in the public schools.

Finally the report on this study includes an analysis of the possible "consequences" of SEL differences and the admission policies for the

freshmen class of a university. It is shown that the existing relationship between socio-economic and academic achievement and aptitude creates a general belief of discrimination in the admission at the state university, when the students are selected for freshmen class according to their entrance index. The discrimination is said to be towards the "poor" on the SEL scale.

With the aid of an example of the Rio Piedras Campus of the University of Puerto Rico, an analysis is made of the applicants for 1972-73 first year class by their family income and type of school (public and private). A further similar analysis of the admitted students shows that more percentage of applicants from the high income group were eligible to be admitted that year. As the main criteria of admission at this Campus is based on the academic and aptitude index, it shows that the SEL and the index are related positively.

Conclusions

From the study, it is possible to draw some conclusions which could be useful as a guide for understanding the problem of academic achievement of school children and as a step for further research in this field.

The socio-economic conditions of school-children, as measured by the SEL score, have improved, in general, for the families of the students of all three different types of schools.

The reading comprehension is, on an average, better in the private schools than in the public.

There is a positive correlation between the SEL score and Re score. [illegible] that [illegible] conditions is partly related to the socio-economic conditions of the individual.

The school drop-out rate has decreased and indications are that it is related to the average SEL of the students.

The relationship between SEL and the academic indices for admission to the universities is positive. It, therefore tends to create a misunderstanding of "discrimination" against the poor of the country, when the main criteria of admission to an university is based on some kind of academic aptitude or achievement measure.

Recommendations

This study is only an attempt to confirm results which an generally known or expected. It is however necessary to continue the concern about the educational and socio-economic diffirences existing among the population. In-depth studies, gathering continously more detailed data, must be initiated, whereas, at the same time improvements in the school system and in the social conditions of the country should be carried out with the help of such modern investigation techniques as operational research.

Uniform measurement and evaluation standards need to be developed to permit feasibility of obtaining data and comparison of groups from time to time and also with different strata. With the aid of the computer, it is also possible to establish an island wide system, which would continuosly

help collect and analyze data, from students of all educational levels, about various socio-economic factors as well as educational variables and academic indices. The information from system would supply data to study the changing pattern of the society from both angles the socio-economic and education levels.

References

1. Administración Central (1973, 1974) Compendio de la Estadísticas de la Universidad de Puerto Rico, Año Académico 1972-73 y 1973-74., Universidad de Puerto Rico.

2. Bangdiwala, I.S. and Lugo Arroyo, José. (1973) La Clientela para el Sistema Educativo de Puerto Rico, Administración Central, Universidad de Puerto Rico.

3. Centro de Investigaciones Pedagógicas, (1969a) Manual de Instrucciones, Escalas Socio-Económicas CSE-SEU- B, C y D, Colegio de Pedagogía, Universidad de Puerto Rico. 69 p.

4. Centro de Investigaciones Pedagógicas (1969b) Manual de Instrucciones, Escalas Socio-Económicas- CSE-SEE- I, II y III. Colegio de Pedagogía, Universidad de Puerto Rico, 67 p.

5. Chapin F.S. (1935) Contemporary American Institutions. Harper and Brothers, New York; 423 p.

6. Collazo, J. (1958) Construction and Standardization of a Level of Living Scale for Puerto Rican Rural Families. An unpublished thesis for master of science degree at the Cornell University, 77 p.

7. Consejo Superior de Enseñanza. (1962) Estudio del Sistema Educativo de Puerto Pico, Vol. II, p. 1851-2025.

8. Consejo Superior de Enseñanza (1964) La Deserción Escolar en Puerto Rico, Universidad de Puerto Rico, Río Piedras, P.R. 190 p.

9. Consejo Superior de Enseñanza. (1966a) Estudio Socio-Económico-I. Universidad de Puerto Rico, Río Piedras, P.R. 140 p.

10. Consejo Superior de Enseñanza. (1966b) Estudio Socio-Económico II. Universidad de Puerto Rico, Río Piedras, Puerto Rico. 86 p.

11. Departamento de Instrucción Pública. (1952) Cuestionario Sims sobre el Estudio Socio-Económico: Manual de Instrucción. 18 p. (mimeografiado).

12. Department of Education (1969) Socio-Economic Measurements of Students in Puerto Rico School System, 47 p. (mimeografiado).

13. Department of Education (1972-73) Statistical Annual Report, Hato Rey, Puerto Rico, 62 p.

14. Guttman, L. (1942) American Sociological Review, 7: p.362.

15. Hollingshead, A.B. (1957) Two Factor Index of Social Position. New Haven; 11 p.

16. Hollingshead, A.E. and Redlich, F.C. (1953) American Sociological Review 18: p.163.

17. Hotelling, H.(1933) Journal of Educational Psychology, 24: p.417.

18. Kahl, J.A. and Davis, J.A. (1955) American Sociological Review, 20: p. 317.

19. Lugo Arroyo, José and Bangdiwala, I.S. (1973) Algunas Características de los Estudiantes que Solicitaron Ingresos en las Instituciones de Educación Superior en Puerto Rico para el Curso Académico de 1972-73.

20. Warner, W.L. et.al. (1949) Democracy in Jonesville, Harper and Brothers, New York; 313 p.

Appendix A

Universe, Sample and Weights
Intermediate and High School
Grades

School Type	Universe 1972 Enrollment Number	Percent	Sample Number	Percent	Weight	Minimum Weighted Sample Number	Percent
Public							
Urban	218,388	73.9	502	56.8	2.764	1387	73.9
Rural	44,853	15.2	177	20.0	1.610	285	15.2
Private	32,264	10.9	205	23.2	1.000	205	10.9
Total	295,516	100.0	884	100.0	2.123	1,877	100.0